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## The Effect of Snack Head Fish Extract Supplements to the Enhancement of Nutritional Status, Levels of Albumin, Hemoglobin and Levels of CD4 on Pregnant Women with HIV AIDS Who Acquire Antiretroviral Therapy in Papua

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### Abstract

Human Immunodeficiency Virus (HIV) is a retrovirus that infect cells of the human immune system (mainly CD4 positive T-cells and macrophages main components of the immune system cells), and destroy or interfere with its function. Infection with this virus results in occurrence of declining in the immune system. The immune system is considered deficient when the system can no longer perform its function to fight infections and diseases. People who are immune deficiency become more susceptible to a wide range of infections, most of which rarely infects people without immune deficiency. This study aims to determine whether the administration is able to extract the snack head fish increases nutritional status and levels of albumin, hemoglobin and CD4 in pregnant women with HIV / AIDS are superbly given anti retroviral treatment (ARV) in the Province of Papua. This type of research is true experiment with the design of a randomized control group pretest-posttest.

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The results showed that the extracts from snack head fish containing amino acids and essential fatty acids essential after the test in paired samples test was no significant effect giving the fish extracts the cork with improved nutrition status, albumin, hemoglobin, and CD4 in pregnant women with HIV.

**Keywords:** Capsules of snack head fish; CD4; albumin; hemoglobin; HIV.

## **1. Introduction**

Problems Human Immunodeficiency Virus (HIV) / Acquired Immuno-Deficiency Syndrome (AIDS) is a major problem that threatens Indonesia and many countries around the world. Since the occurrence of the epidemic, more than 60 million people worldwide infected with HIV, 30 million of whom died of AIDS. In 2009, an estimated 33.3 million people living with HIV. Of that number was 2.6 million new cases and 1.8 million deaths caused by AIDS. The addition of this number shows the effect of antiretroviral therapy that can prolong life expectancy, which is a now available lot for people with HIV. This can be seen clearly from the trend of the number of deaths due to HIV and declining when compared with the previous year. The same trend was seen in Indonesia, where cumulatively, reflecting the increase in the number of people with HIV, although it can be seen a decrease in the number of new cases in 2011 [1].

HIV infection in pregnant women can be life threatening and can also transmit the mother to her baby that is transmitted during pregnancy 5-10%, 10-20% during labor and breastfeeding 5-20%. More than 90% of children infected with HIV, is transmitted through the process of transmission from mother to child. Despite the prevalence and transmission of HIV from mother to baby is still limited, Total Project; ah HIV-infected pregnant women tends to increase. It is projected to increase from 0.38% in 2012 to 0.49% in 2016. This can be prevented through prevention of transmission from mother to baby referring to the WHO's recommendations of 2010. Where basically all pregnant women be offered HIV tests conducted when mothers visit antenatal care [2].

Antiretroviral (ARV) is a long-term antiretroviral drug use (lifetime) for treating pregnant women and preventing HIV transmission from mother to baby. Provision of ARVs in pregnant women with HIV in addition to reducing the risk of HIV transmission from mother to child, is to optimize the; the condition of maternal health by lowering HIV levels as low as possible. The choice of therapy is recommended for pregnant women with HIV is to use a combination of three drugs (2 NRTIs + 1 NNRTI, as minimal as possible to avoid triple nukre (3NRTI) [3].

Pregnant women with HIV need the intake of nutrients containing macronutrients (carbohydrate, protein, fat) and micronutrients (vitamins and minerals) in sufficient quantities, [4]. The lack of nutrient intake gives a direct effect on HIV patients, [5]. As a result of nutrient intake that is less and the catabolic process that occurs, pregnant women with HIV-infected positively will experience protein breakdown more quickly in the body, resulting in concentration of albumin is low [6] ,

Nutritional intake is important for everyone, especially for people living with Human Immunodeficiency Virus (HIV) [7]. Intake of adequate nutrition is essential to maintain a person's immune system, to maintain a level of

physical activity and for optimal quality of life [8]. At nutrition causes decreased biological functions of the body. Even in people with HIV changes the clinical condition that is not only a result of the problem of nutrient intake, but also as a result of the disease process [9]. It is characterized by a decline in nutritional status and immunodeficiency in people with HIV / AIDS, Ockengaa [10], which ultimately lead to decreased immunity.

Proteins are part of the immune substances (antibodies), it is imperative defending the body against infection [11]. HIV-infected patients are positive, protein breakdown occurs more rapidly in the body so that a low albumin concentration but with increasing energy input HIV-infected patients can improve the balance of protein [13]. According to Nicholas and his colleagues [13] reported in his study that the administration of albumin can improve the body's resistance to stress from HIV infection.

Snack head fish is another alternative as a source of protein albumin, Taslim, [14] and is a source of antioxidants animal that serves as a binder radical and play a role in the cleaning process as well as the arrest of ROS, Sunatrio [15]. The study, reported Nicholas and his colleagues [13], reported that the administration of albumin that is rich in antioxidants can increase the body's resistance to stress from HIV infection through the obstacle in the formation of ROS, and its influence on the levels of Nitric Oxide (NO) produced [16].

Based on experimental studies utilizing by Kusuma wardhani of snack head fish extract (*Ophiocephalus striatus*) in the form of flour formula, found a significant increase in albumin in the treatment group compared with the control group after 3 weeks of supplementation. The average value of  $2.0400 \pm 1.4661$  change compared to the control of  $1.4661 \pm 0.8226$  and  $p = 0.018$  ( $p < 0.05$ ). It is known that snack head fish extract (*Ophiocephalus striatus*) have fairly high levels of protein (25.5%) compared to other fish such as sardines (21.1%), fish (20.0%), snapper (20.0%), and a gold fish (16.0%).

Papua Province ranked first in the cumulative cases of HIV / AIDS in July-September 2014 amounted to 26 235 people consisting of HIV and AIDS 61.18% 38.8% [17]. From the data of cumulative cases of HIV / AIDS in Papua who died 25.37% due to psychosocial factors, and no known cause 14.09%. While the number of such cases are of reproductive age 15 with 39 years as much as 63.77% this was due to promiscuity, and these cases were pregnant women amounted to 9.39% [17].

The latest data from AIDS Commission (KPA) of Papua Province reported that up to 31 March 2016 the number of people living with HIV in Papua Province as much as 25 233 cases of which 98% are caused by sex. Number of people living with HIV / AIDS is highest in Jayawijaya district and the city as much as 5.293 cases Mimika as many as 4,524 cases. By age group, the highest number of people with HIV / AIDS are in the age range 25-49 years as many as 5,333 cases and as many as 9211 cases of AIDS [18].

Based on the above thought to be possible with the provision of cork fish extracts the in the diet can increase the nutritional status, albumin, hemoglobin and blood CD4 levels in pregnant women with HIV.

## **2. Materials and Methods**

This type of research is true experiment with the design of a randomized control group pretest-posttest. This

research was conducted at the community health center of Sentani. Samples are research subjects with a total sampling "in which all pregnant women with HIV / AIDS amounted to 10 people and all of the research sample. And divided into two groups, namely Group I: receive ARV therapy + fish capsules supplements of snack head fish, Group II: received ARV therapy + Placebo. There were 10 subjects given a sequence number to be drawn at random by treatment or P1 and P2. P1 is the group given flour of snack head fish treatment + obtain ARV therapy, and P2 is a control group who were given placebo + obtain ARV therapy.

### 3. Results

#### 3.1 The measurement results Anthropometry Research Subjects

##### Arm Circumference (AC)

At the anthropometric measurements for arm circumference (AC), given the fish stocks extract the cork from baseline to end of study for 2 months there was an increase. While the dosage given only placebo from baseline to end of study during 2 months of no improvement. More details shown in the figure below:

**Table 1:** Average Value Upper Arm Circumference before and after the intervention in the placebo group,  
Group of snack head fish extract

Group	Arm Circumference Measurement		Value p	Difference
	Before	After		
	mean±SD	mean±SD		
snack head fish Extract	22.40±0.89	24.40±0.89	0.042**	2.00±0.00
Placebo	22.80±0.84	22.40±0.89	0.157**	-0.40±0.55
Value p	0.486*	0.016***		0.008***

Statistical test results paired sample test showed that there were significant differences in arm circumference (AC) study subjects before and after treatment in the intervention group ( $p = 0.042 < 0.05$ ), whereas the control group there was no difference because the value ( $p = 0.017 > 0.05$  ).

##### Weight

Before and after the study period of 60 days on physical anthropometry weight (kg) of research subjects can be

shown in the figure below.

**Table 2:** Average Value Weight before and after the intervention and placebo control groups of snack head fish extract

Group	Weight Measurement		Value p	Difference
	Before	After		
	mean $\pm$ SD	mean $\pm$ SD		
snack head fish Extract	53.20 $\pm$ 4.71	58.20 $\pm$ 3.35	0.025***	5.00 $\pm$ 1.87
Placebo	50.40 $\pm$ 5.94	49.20 $\pm$ 6.34	0.109**	-1.2 $\pm$ 1.30
Value p	0.433*	0.023*		0.000*

\*Independent t tests

\*\*Paired t-test

\*\*\* Mann Whitney Test

The weight of subjects before and after the intervention in the experimental group that were given extracts from snack head fish rose significantly ( $p = 0.025$ )  $p < 0.05$ . While the control group was given placebo ( $p = 0.109$ )  $p > 0.05$ .

### C. Body Mass Index (BMI)

Measurement of body mass index (BMI) study subjects are shown in the table below:

**Table 3:** The mean BMI value before and after the intervention group and the placebo control group of snack head fish extract

Group	BMI Measurement		Value P	Difference
	Before	After		
	mean $\pm$ SD	mean $\pm$ SD		
snack head fish Extract	22.50 $\pm$ 1.96	24.62 $\pm$ 1.50	0.004**	2.12 $\pm$ 0.82
Placebo	22.68 $\pm$ 2.40	22.14 $\pm$ 2.62	0.107**	-0.54 $\pm$ 0.58
Value p	0.897*	0.104*		0.000*

\* Independent t tests

\*\*Paired t-test

The test results paired physical anthropometry sample test on body mass index (BMI) in the placebo control group before and after intervention showed no significant differences ( $p = 0.107 > 0.05$ ), whereas in the group cork fish extract showed the opposite result, that is before and after the intervention significantly different ( $p = 0.004 < 0.05$ ).

- Biochemical examination results
- Albumin

Albumin levels in the blood after 60 days of intervention can be seen in the table below:

**Table 4:** Average Value Albumin before and after the intervention in the placebo control group and the preparation of flour snack head fish extract.

Group	Albumin Measurement		Value p	Difference
	Before	After		
	mean $\pm$ SD	mean $\pm$ SD		
Snack head fish Extract.	2.52 $\pm$ 0.43	3.24 $\pm$ 0.21	0.024**	0.72 $\pm$ 0.45
Placebo	3.68 $\pm$ 0.23	3.72 $\pm$ 0.25	0.178**	0.04 $\pm$ 0.05
Value P	0.001*	0.011*		0.008***

\* Independent t tests

\*\*Paired t-test

\*\*\* Mann Whitney Test

On examination Albumin levels of study subjects paired samples test results showed that no significant difference before and after intervention on placebo control group ( $p = 0.178 > 0.05$ ).

While in the treatment group were given fish stocks cork flour was no significant difference between before and after the intervention, namely ( $p = 0.024 < 0.05$ ).

## Hemoglobin

Measurement of Hemoglobin levels can increase the difference shown in the table below:

Based on statistical test known paired sample test no significant difference before and after the intervention in the group given snack head fish meal stocks ( $p = 0.024 < 0.05$ ) whereas in the placebo control group ( $p = 0.099 > 0.05$ ) increase in hemoglobin is not meaningful.

**Table 5:** The mean hemoglobin value before and after the intervention the placebo control group and treatment groups of the snack head fish extract stocks.

Group	Hb Measurement		Value P	Difference
	Before	After		
	mean±SD	mean±SD		
Snack head fish Extract	8.38±1.98	8.60±2.22	0.024**	0.48±0.30
Placebo	8.30±2.07	8.38±2.11	0.099**	0.08±0.08
Value P	0.952*	0.735*		0.008***

\* Independent t tests

\*\*Paired t-test

\*\*\* Mann Whitney Test

## CD4

The results of biochemical examination for research subjects CD4 levels shown in the table below.

**Table 6:** Mean CD4 values before and after the intervention and placebo control groups of snack head fish extract.

Group	CD4 Measurement		Value P	Difference
	Before	After		
	mean±SD	mean±SD		
Snack head fish Extract	222.60±197.57	234.60±191.25	0.025**	12.00±7.65
Placebo	475.60±110.90	472.40±112.57	0.306**	-3.2±6.10
Value P	0.037*	0.043*		0.008*

\* Independent t tests

\*\*Paired t-test

On examination of the levels of CD4 study subjects paired samples test results showed that no significant difference before and after the intervention in the control group placebo ((p = 0.306 > 0.05). While in the treatment group were given fish stocks cork flour was no significant difference between before and after the intervention, namely (p = 0.025 < 0.05).

## 4. Discussion

### 4.1 The increasing of BMI and improving of nutritional status

The results of this study showed that pregnant women with antiretroviral drugs to treat HIV was supplemented by cork fish extracts could improve the BMI (nutritional status), compared to pregnant women with HIV received antiretroviral treatment supplemented placebo. This happens because the snack head fish extract capsules containing essential amino acids, vitamins, and minerals needed by the body. Giving snack head fish extracts in patients pregnant women with HIV may increase the patient's albumin followed by weight gain and an increased intake of energy, protein, carbohydrates and fiber, because the snack head fish extract capsules able to supply the acid - essential amino acids, especially lysine, methionine, glycine histidine and arginine which increases appetite and a source of fat, mineral salts, vitamins and UGF (Uncharacterized growth Factors). Similar studies were supplemented with extracts from snack head fish extract, in addition to improving the serum albumin level of HIV / AIDS also increase total energy intake, improve appetite (lysine, glycine, histidine and arginine), and amino acid glutamine and "Branched Chain Amino Acid (BCAA), "of snack head fish anabolic effect can increase energy intake and improving nutritional status and muscle mass of people with HIV / AIDS.

### 4.2 Effect of snack head fish extracts on Arm Circumference of pregnant women with HIV

Measurement Arm Circumference (AC) is one way to ascertain the nutritional status in pregnant women and women of fertile age (WUS) [19]. AC measurements can also give an idea about the state of the muscle tissue and the fat layer under the skin. In this study are intended AC is associated with being fat under the skin. Risked as of data results in 2007 also found that increasing age of a woman, the greater the size of the circumference of his upper arm, this is due to general body fat percentage will always increase with age, primarily due to reduced physical activity [20].

The measurement results Arm Circumference (AC) subjects at the beginning of the study showed that as many as 2 people have less AC size (<23) of the placebo control group and the normal (> 23) there are 3 people. In the group of fish stocks cork at baseline by 2 people who have less AC size (<23) and the 3 people who have normal AC size (> 23). After the intervention for 60 days in the two study groups: group control placebo and group dosage extract snack head fish extract then be measured AC and subjects included in the measurement is less (<23) of group control placebo remained 2, where there is no increase AC group placebo, whereas in the group preparations extracts snack head fish extract after the intervention for 60 days no increase AC (> 23) in 2 patients whose arm circumferences size less at baseline, whereas the normal size arm circumferences size increasing, it is because at the moment of given the intervention, Snack head fish extract, subjects feel increased appetite and drowsiness than usual. So this may explain that there has been an increase in the nutritional status of patients with HIV pregnant women who received supplementation with snack head fish extract According to [6] which states that the increase in the value of arm circumference (AC) describes has been an increase in endogenous protein deposits associated with an increased intake of protein as a source of amino acids. Paired sample test results show that there is a significant relationship between before and after intervention in groups of fish stocks extract the cork.



#### ***4.3 The Increasing of Weight in pregnant women with HIV***

Weight is one of the anthropometric measures used for a long time in the determination of nutritional status, especially in adults. Weight can provide a snapshot of a person's body mass and can be affected by various factors, both short term and long term. As anthropometric parameters are easily influenced by other factors, a person's weight is easy to change, whether an increase or decrease in weight. This can affect the nutritional status and health status in adults. The results of weight measurement study subjects showed the lowest body weight is 42 kg and the highest 60 kg. After the intervention for 60 days, the control lost weight. Whereas in the group of flour snack head fish stocks after intervention there is weight gain, although very small.

Results of paired samples test between before and after intervention showed that the group performed fishmeal cork significant increase ( $p = 0.025$ )  $p < 0.05$ . Supplementation with impartial and regular menu can improve the nutritional status of patients with HIV is accompanied by an increase in body composition and CD4, while in the placebo control group of paired sample test results of the analysis showed no difference between before and after the intervention, but that does not mean there is no increase in weight. The increasing of Weight placebo in control group is so small that when analyzed it becomes not meaningful. Nutritional status of people living with HIV / AIDS is strongly influenced by the needs and nutrient. The nutrients that do not meet the needs resulting from HIV infection will lead to malnutrition is multi factorial among other things due to loss of appetite, impaired absorption of nutrients in the digestive tract, loss of body fluids due to vomiting and diarrhea, impaired metabolism of nutrients, opportunistic infections and other diseases accompanying HIV / AIDS (Frits, 2005). Nutritional therapy clearly has advantages in performance and immunology clinic on HIV / AIDS. Experts recommend the use of BCAA in the management of HIV infection and AIDS.

Anorexia is almost always occurs in AIDS, treatment is recommended granting nutrition as often as possible in small portions, high calorie high-protein. BCAAs Leucine, isoleucine and Valine can trigger protein synthesis and inhibits protein catabolism. Research in RSU Dr. Soetomo showed that enriched 30% BCAA branched chain amino acids administered parenterally (intravenous) causes anorexia decrease after 5 days of therapy. The patients were also given conventional hospital nutrition orally, resulted in improved nutrition gradually increase in body weight occurred in 74.6% of patients each week, followed by an increase in the size of the circumference of the arm. the quality of life for people with HIV gradually improved [9].

#### ***4.4 Effect of snack head fish extracts on levels of hemoglobin***

The results of this study proved that pregnant women with HIV who supplemented snack head fish extract capsules can increase the value of Hemoglobin in blood than the control group supplemented placebo. This can be explained by Sudiono and his colleagues in 2007, the handbook pathology hematology clinic that Hemoglobin is liquid red are in erutosit, when erythrocytes lysed will be out "haemolysis", Hemoglobin is composed of "HEM" formed from the raw materials, glycine, suksnil CoA, priridoksin and (Fe), while the "globin" is formed from the raw material amino acid, asparagine, histidine, leucine, proline, glycine, tryptophan, cysteine, isoleucine, phenylalanine, firosin, alanine, walin, threonine, lysine, arginine, aspartate, glutamine, methionine, and serine. So that by supplementing with fish extract capsules are the building blocks of cork Hem

"many capsules contained daam albumin such as glycine, phritoksin and Fe. In addition, extra capsules fish gabusjuga much acid - essential amino acids, such as acid aspartate, glutamate acid, serine, glycine, histidine, arginine, threonine, Alamine, proline, tyrosine, valine, methionine, cystine, isoleucine, leucine, phenil , Alamine and lysine, as a precursor of "Globulin" [14]. So obviously there will be an increase in the value of hemoglobin in the blood of patients.

The results of this study prove that the group of pregnant women with HIV who supplemented snack head fish extract extracts can increase the value of Hb in blood than the control group supplemented with placebo. This can be explained because Hemoglobin is composed of "Hem" is made up of raw materials; glycine, suksnil CoA, pyridoxine, and Fe, while the "globin" is formed from the raw material amino acids, asparagine, histidine, leucine, proline, glycine, tryptophan, cysteine, isoleucine, phenylalanine, tyrosine, alanine, valine , threonine, arginine, aspartate, glutamine, methionine and serine. Hem-forming material contained in many fish extract capsules cork composition contains a lot of Iron (Fe) of about 0.8 to 21 mg / kg and Copper (Cu) 0.4 mg / kg. With fish extract supplementation cork that contains raw materials forming Haemoglobin. So the results of this study showed that the group of pregnant women with HIV received antiretroviral treatment and extract capsules supplemented with cork fish can increase the value of hemoglobin in the blood.

#### ***4.5 Effect giving of snack head fish extracts to the increasing of albumin***

The results of this study proved that pregnant women with HIV who supplemented snack head fish extract capsules can increase the levels of albumin in blood than the control group supplemented placebo. The mechanism of increased levels of serum albumin respondents in this study as previously described is that it can through increasing total energy intake or the direct effect by supplementation. Nutrition adequate support can improve visceral protein levels in the body have been used as a source of energy due to the energy intake from food is insufficient in the face of the body of a chronic inflammatory process that occurs. At the time of occurrence, inflammation, the body will experience an increase in resting energy expenditure (resting energy expenditure = REE) that will improve the energy needs [21]. Increased levels of albumin in the study also caused an increase in protein intake after intervention for 6 weeks, although when compared with the control group the increase is not statistically significant.

The increase intake better in the intervention group is the glutamate content in snack head fish extract capsules so as to accelerate the absorption of the stomach and increase the intake of food. This study according to Zhao [22], comparing the gastric emptying time by adding a protein-MSG diet vs. diet of protein-carbohydrate diet versus non-MSG MSG showing the gastric emptying half time faster on-MSG protein diet compared with the diet protein -Non MSG and no effect on carbohydrate-MSG diet. Rapid gastric emptying will increase intake for a long transit time will give full sensation and will decrease your appetite and ultimately lower energy intake. So it can be assumed that the extract cork fish accompanied glutamate content in it giving the effect of better absorption and ultimately increase your appetite.

#### ***4.6 Effect of given Snack head fish Extract to increased levels of CD4***

CD4 test is a standard test to assess prognosis progress to AIDS or death, to establish a differential diagnosis in symptomatic patients, and to take therapeutic decisions regarding antiretroviral therapy (ART) and to take therapeutic decisions regarding antiretroviral therapy and prophylaxis for opportunistic pathogens. CD4 count is the most dependable indicator of prognosis. The results of the initial measurement of CD4 levels study subjects showed that as many people who have less than 350 CD4 and CD4 subjects had more than 500.

Statistical test results paired sample test showed that there were significant differences increase in CD4 cell count before and after the intervention, groups of flour snack head fish stocks ( $p = 0.025 < 0.05$ ), but differ in the control group ( $p = 0.306 > 0.05$ ). The content of acid amino glutamate can increase the levels of cytokines CD4 +. According to Green and his colleagues [23] that CD4 + cytokines is essential for stimulating helper cells Th 1, producing IFN-activating alveolar macrophages, stimulates Th 1 produce IFN-1. CD4 is the basis for the formation of a specific immune response against intracellular pathogens especially infections. CD4 count is a highly significant predictor in predicting disease progression and survival. Guidelines from the US Department of Health and Human Services (DHHS) and the WHO is recommending the provision of ARV therapy based on immunological markers CD4 cell counts than others. Progressive decline in CD4 associated with the progression of the disease and an increased risk of opportunistic infections, wasting, and death. A study shows HIV / AIDS patients with CD4 count  $< 200$  cells / mm<sup>3</sup> have a 591 times higher risk of anemia ( $P = 0.001$ ) compared with patients with a CD4 count  $> 200$  cells / mm<sup>3</sup>.

The absolute CD4 lymphocyte count in adolescents and adults ranges from 500 to 1500 cells / mm<sup>3</sup> of blood. In general the number of CD4 T lymphocytes decreased progressively as the progression of the disease. The possibility of disease progression to stage AIDS without antiretroviral therapy increased with increasing degrees immunodeficiency (decrease in CD4 cell count). Opportunistic infections and other HIV-related conditions has increased significantly with a CD4 lymphocyte count  $< 200$  cells / mm<sup>3</sup>. The response to ARV influenced by the stage of an immunologist at the commencement of therapy. Patients who started antiretroviral therapy with CD4  $< 50$  cells / mm<sup>3</sup> have a higher risk of death.

Snack head fish extract a high animal protein source (5,524g / 100ml), because it contains protein and albumin and mineral Copper (Cu), Zinc (Zn), and Calcium (Ca) in large quantities. Fish extracts the cork is a source of protein with amino acid content. Amino acids capable of regulating several processes in the body, including The activation P70S6K (translation incision mRNA), gene expression, and the absorption of amino acids by the body cells. The amino acid content of the extracts from snack head fish extract including leucine, arginine and glutamate. The content of fatty acids in snack head fish is also very good for health. Snack head fish has essential fatty acids are quite high. In addition to essential fatty acids, snack head fish also has a high mineral content as well, especially calcium, iron and zinc are very good for health.

People with HIV need the intake of nutrients that contain macronutrients (carbohydrates, protein, fat) and micronutrients (vitamins and minerals) in sufficient quantities [9]. Also in pregnant women with HIV are in need of nutritious intake. The lack of nutrient intake gives a direct effect on pregnant women with HIV. Albumin snack head fish extract is one of the nutritious foods to mothers with HIV comprehend [5]. Why snack head fish extract is one of the fish which is good for pregnant women with HIV? Because one of the protein content in

snack head fish extract is albumin. Albumin of snack head fish extract is albumin from outside the body that can be used as an alternative to albumin if the body is experiencing a shortage of albumin. For pregnant women, we all know that the protein albumin acts as additional nutrition to improve the nutrition of the fetus, including the prevention of infant jaundice (jaundice). That's important to keep the nutrient levels in pregnant women. Price low albumin in pregnancy also affects the energy contractions during labor. Price low albumin can also cause a delay in the process of caesarean delivery. In addition, there are many other benefits albumin snack head fish extract or snack head fish extract for pregnant women. Because the benefits of cork fish that is so extraordinary, it is not surprising if the fish is in the category of good fish for pregnant women with HIV.

## **5. Conclusion**

- 5.1 Patients pregnant women with HIV who obtain antiretroviral (ARV) and supplemented capsule albumin or capsule extracts from snack head fish extract on the nutritional status of patients with both BMI, weight and arm circumference showed an increase, although only slightly compared to only received antiretroviral therapy (ARV).
- 5.2 The test results paired physical anthropometry sample test on body mass index (BMI) in the placebo control group before and after intervention showed no significant differences ( $p = 0.107 > 0.05$ ), whereas in the group of fishmeal cork showed the opposite results, which before and after the intervention significantly different ( $p = 0.004 < 0.05$ ).
- 5.3 The research subject's weight before and after the intervention in the experimental group that were given extracts from snack head fish extract rose significantly ( $p = 0.025$ )  $p < 0.05$ . While the control group was given placebo ( $p = 0.109$ )  $p > 0.05$
- 5.4 Statistical test results paired sample test showed that there were significant differences in arm circumference (AC) study subjects before and after treatment in the intervention group ( $p = 0.042 < 0.05$ ), whereas the control group there was no difference because the value ( $p = 0.157 > 0.05$ ).
- 5.5 Patients pregnant women with HIV who obtain antiretroviral (ARV) and supplemented capsules or capsules albumin extract the cork fish Albumin increased after intervention for two months rather than just taking antiretroviral (ARV)
- 5.6 On examination Albumin levels of study subjects paired samples test results showed that no significant difference before and after intervention on placebo control group ( $p = 0.178 > 0.05$ ). While in the treatment group were given fish stocks cork flour was no significant difference between before and after the intervention, namely ( $p = 0.024 < 0.05$ ).
- 5.7 Patients pregnant women with HIV are receiving anti-retrovirals (ARVs) supplemented albumin capsule or capsule fish extracts the cork for increased levels of hemoglobin, although only slightly after the intervention for two months rather than just taking antiretroviral drugs (ARVs).

- 5.8 Based on statistical test known paired sample test no significant difference before and after the intervention in the group given fish meal stocks cork ( $p = 0.024 < 0.05$ ) whereas in the placebo control group ( $P = 0.099 > 0.05$ ) increase in hemoglobin is not meaningful.
- 5.9 Patients pregnant women with HIV are receiving anti-retrovirals (ARVs) supplemented albumin capsules or capsules snack head fish extract extracts increased the CD4 although only slightly. After intervention for two months rather than just taking antiretroviral drugs (ARVs).
- 5:10 On examination CD4 levels study subjects paired samples test results showed that no significant difference before and after the intervention in the placebo control group ( $p = 0.306 > 0.05$ ). While in the treatment group were given flour snack head fish stocks was no significant difference between before and after the intervention, namely ( $p = 0.025 < 0.05$ ).

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